

Remarks

Claims 1-14 remain in the application. Claims 1 and 12 have been amended to provide an upper limit of 4.9 wt.% Si. It is noted with appreciation that claims 11 and 13 would be allowable if written in independent form. Thus, Applicant has used the upper limit of 4.9 wt.% Si in claims 1 and 12 and, therefore, it is respectfully submitted that claims 1 and 12 are patentable over Loue et al. U.S. Patent 5,879,478.

Further, it is respectfully noted that claim 14 is patentable because it has the same range of Si and Cu (3.5 to 4.9 wt.% Si and 3.7 to 4.8 wt.% Cu) as claim 13, which is allowable.

Applicant hereby affirms election of claims 1-14.

In the Office Action, claims 1-10, 12 and 14 were rejected as follows:

Claims 1-10, 12, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Loue et al (US 5,879,478 A).

Loue teaches a process for forming an Al-Si-Cu alloy having a globular microstructure by thixoforming, which involves heating said Al-Si-Cu alloy to a semisolid state and injecting into a mold (column 1 lines 15-21, column 4 lines 46-51), thereby producing a non-dendritic globular structure (column 1 lines 26-27). Loue teaches said Al-Si-Cu alloy preferably comprises (in weight%) 5-6% Si, 3.5-4.5% Cu, <1% Mg, 0.005-0.05% Sr (see claims 1 and 4), which overlaps, or is a close approximation of (with regard to Si), the presently claimed composition ranges in independent claims 1, 12, and 14. Loue does not mention aging at 200-400°F for 1-24 hours (claim 1), solution heating at 800-1000°F for 0.1-12 hours, quenching, and ageing to achieve a certain UTS and YS (claim 12), or providing a T6 temper and achieving a certain UTS and YS (claim 14).

However, Loue teaches that it is known in the art to adjust the strength and/or ductility of Al-Si-Cu-Mg thixoformed alloys (column 3 lines 3-4) by using different heat treatments (column 1 lines 52-54), for example, by applying a T6 temper (column 1 line 57).

More detail is given in "Aluminum and Aluminum Alloys" concerning conventional heat treatment times and temperatures, and specifically concerning T6 heat treatments, that can be applied to 3xx series alloys. "Aluminum and Aluminum Alloys" teaches that 3xx alloys are typically solution heat treated at temperatures 950-1000°F (see Table 5) for 4-12 hours, quenched to develop supersaturation (p 292, 2nd column), and artificially aged at 310-475°F for typically 2-18 hours to achieve a T6

temper (see Table 5). "Aluminum and Aluminum Alloys" teaches quenching most frequently occurs by cold water (p 299, 3rd column). "Aluminum and Aluminum Alloys" teaches T6 or T5 heat treatments can be applied (see Table 5). It would have been obvious to one of ordinary skill in the art to perform solution heating, quenching, and aging as taught by "Aluminum and Aluminum Alloys" for the 3xx series alloy taught by Loue, because Loue teaches that it is known in the art to adjust the strength and/or ductility of Al-Si-Cu-Mg thixoformed alloys (column 3 lines 3-4) by using different heat treatments (column 1 lines 52- 54), and "Aluminum and Aluminum Alloys" teaches various heat treatments conventionally applied to precipitation hardenable 3xx series alloys to achieve desired mechanical properties (see "Aluminum and Aluminum Alloys", p 292).

It is respectfully submitted that claim 1 is patentable over Loue for a first reason. That is, Loue does not disclose or even suggest an alloy having silicon in the range of 3.5 to 4.9 wt.%. Loue notes at col. 2, lines 63-64, as follows:

The silicon content does not go below 5% since at that point the alloy becomes difficult to cast.

Thus, it is submitted that this is a teaching away from Applicant's invention. The U.S. Patent Office agrees with this and notes in the Office Action (page 6, ¶5) that Loue does not "teach or suggest a method of thixoforming an alloy with 3.9-4.9% Si".

It is respectfully submitted that Applicant's invention as claimed is patentable over Loue for another reason. That is, Loue is *silent* with respect to aging the members in the range of 200° to 400°F for 1 to 24 hours. Thus, for this additional reason, claim 1 is patentable over Loue.

Claim 12 is patentable over Loue for the reasons set forth above and also for the additional reason that claim 12 requires solution heat treating at 800° to 1000°F for 0.1 to 12 hours.

Claim 14 is patentable over Loue for the reason that it requires an alloy having 3.5 to 4.9 wt.% Si. As noted earlier, Loue teaches away from this range and states that silicon cannot be less than 5 wt.%. Thus, for this reason, claim 14 is patentable over Loue.

Claims 2-11 and 13 are patentable over Loue for the reasons set forth above.

In view of the above amendments and remarks, it will be noted that a sincere attempt has been made to place this application in condition for allowance. Therefore, reexamination and reconsideration are requested and allowance solicited at an early date.

Respectfully submitted,

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